Tshingombe Fiston: The Integrated Technologist

Deep Expertise in Electrical Engineering, Amplified by a Strategic Command of the Full Technology Landscape.

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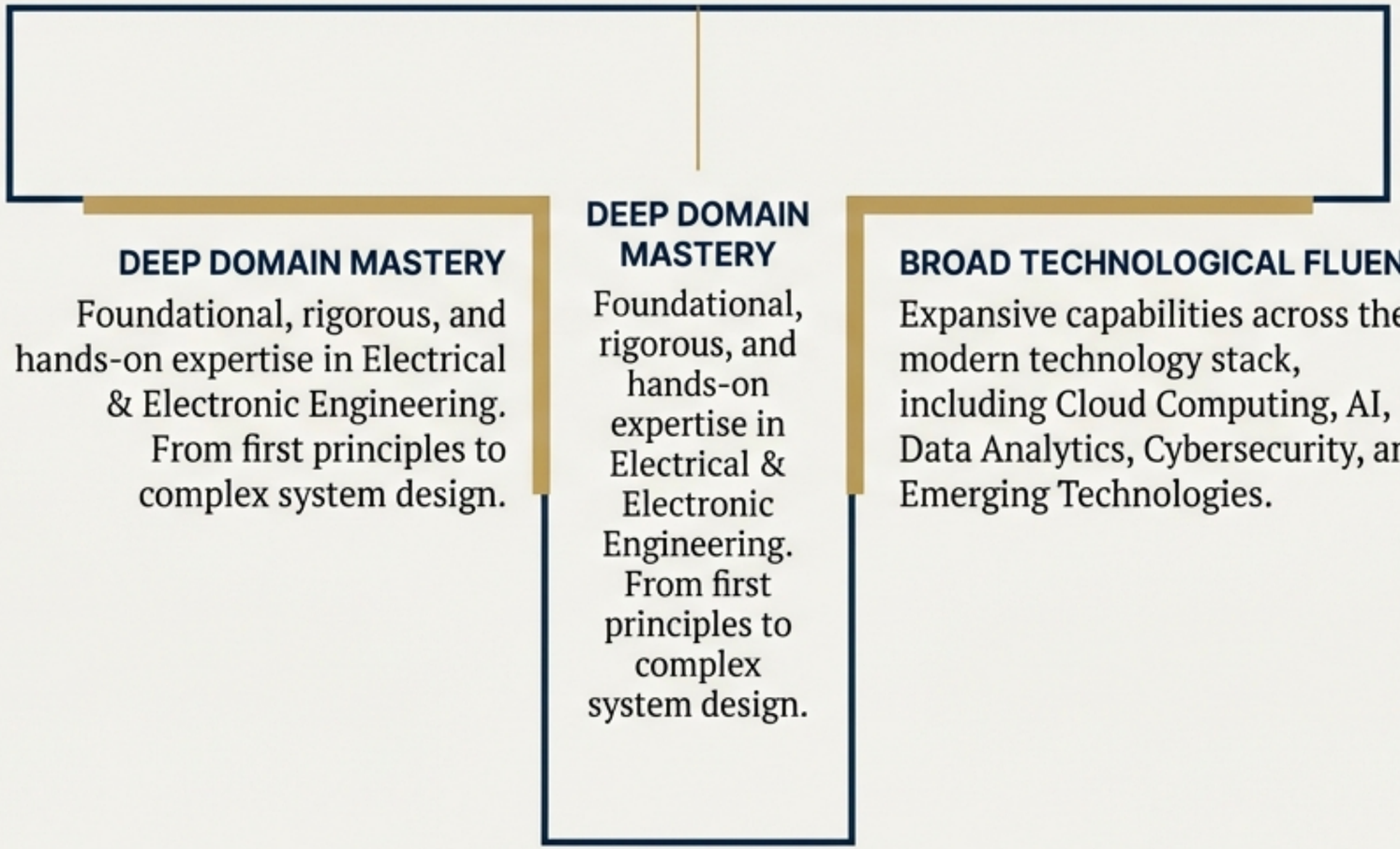
Architected for Modern Challenges: A T-Shaped Profile

The T-shaped model provides a powerful framework for solving complex, interdisciplinary problems. It combines profound expertise in a single domain with the cross-functional fluency needed to innovate and lead in a connected world.


DEEP DOMAIN MASTERY
Foundational, rigorous, and hands-on expertise in Electrical & Electronic Engineering. From first principles to complex system design.
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Foundational, rigorous, and hands-on expertise in Electrical & Electronic Engineering. From first principles to complex system design.
BROAD TECHNOLOGICAL FLUENCY
Expansive capabilities across the modern technology stack, including Cloud Computing, AI, Data Analytics, Cybersecurity, and Emerging Technologies.

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Grounded in First Principles: The Theoretical Engineering Foundation

Advanced Mathematics

Hyperbolic Identities:

$$\cosh(x \pm y) = \cosh(x)\cosh(y) \pm \sinh(x)\sinh(y)$$

Euler's Relation

$$e^{j\theta} = \cos(\theta) + j\sin(\theta)$$

Integration by Parts

$$\int u\frac{dv}{dx}dx = uv - \int v\frac{du}{dx}dx$$

De Moivre's Theorem:

$$(\cos\theta + j\sin\theta)^n = \cos(n\theta) + j\sin(n\theta)$$

Core Engineering Science

- NATED Subjects:
  - Electrotechnology
  - Industrial Electronics
  - Engineering Physics
- Core Concepts:
  - AC/DC Current & Machines
  - Thermodynamics (Q_{in}, Q_{out})
  - Electrostatics & Transmission

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From Theory to Calculation: Solving Real-World Engineering Problems

Calculation 1: Heat Plant Analysis

Boiler efficiency formula:

$$h_{plant} = \frac{m_s(h_4 - h_1)}{m_f \times h_v} \times \frac{100}{1} = 83.25\%$$

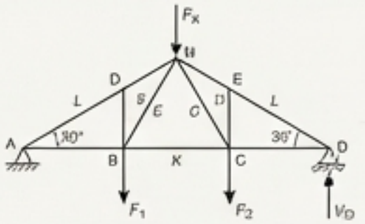
Q_{econ} = 1836 kj/kg Q_{super} = 4972.5 kg/kg

Energy Component	Value (KJ/kg)	Percentage
Qfuel	32000	100%
Qecon	1836	5.74%
Q_Eva	19831.55	61.97%
Q_Super	4972.5	15.54%
Qflugas	3109.9	9.72%
Unaccounted	2255	7.03%

Calculation 2: Structural Nodal Analysis

L = 355 x cos(30) = 321.73Nm

AE = 455 x sin(30) = 227.5Nm



Member	Magnitude	Nature
AB	*Value*	tie
AE	*Value*	strut
BD	*Value*	*Value*
BC	*Value*	*Value*

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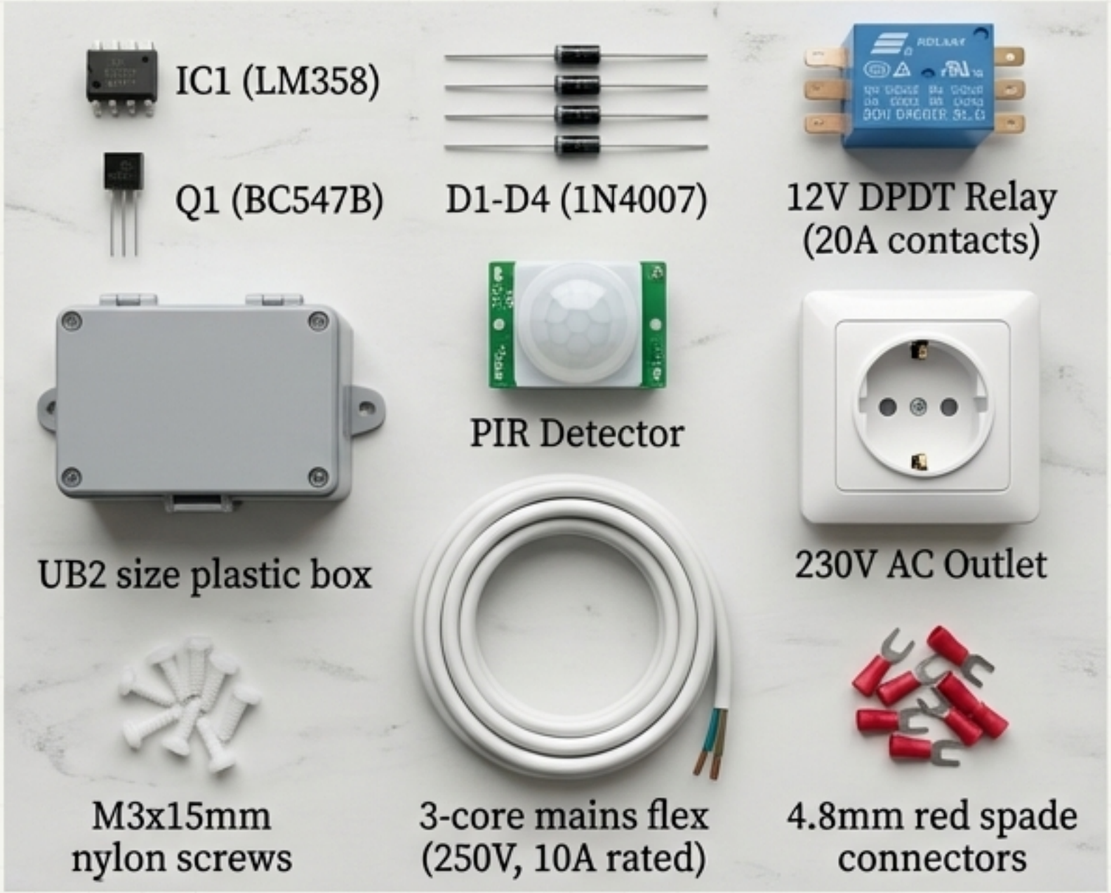
Synthesis in Practice: The PIR-Triggered Mains Switch Project

Project Overview

Problem Statement
To design a system that enhances home security by detecting mains power outages—whether from grid failure or malicious tampering—and triggering an alarm.

Solution Overview
A battery-operated switch unit that monitors mains power, provides a 12V supply to a PIR detector, and activates a 20A-rated relay to switch power loads or an alarm. Incorporates a delay to prevent false alarms from brief interruptions.

Key Components



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Engineering for Data: Building a Microcontroller-Based Weather Logger

Key Technical Specifications

Project Goal
Develop a standalone weather station for data logging, operable via onboard LCD or remotely via a PC and USB connection.

Microcontroller
ATmega88 with firmware written in C.

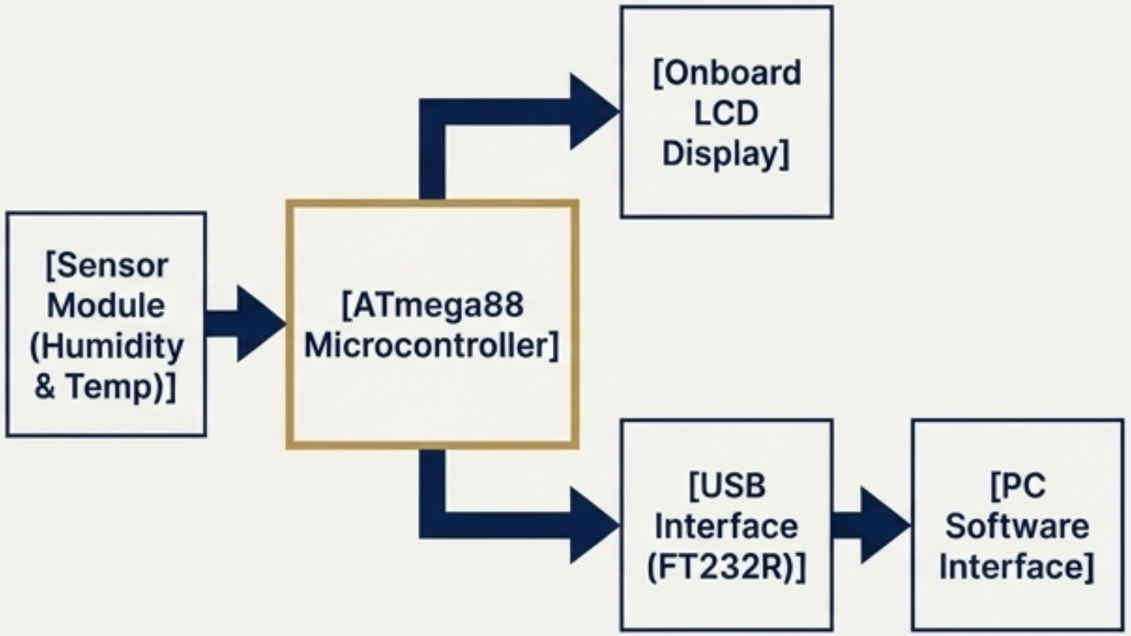
Power Supply
Nominal 3.3V, with options for USB power or standalone 3.5V to 30V input.

Sensors
Humidity transducer with frequency output (6kHz to 7kHz), dual internal temperature sensors.

Data Handling
16-bit counter/timer measures sensor output pulses; calibration parameters stored in EEPROM.

Current Draw
CPU @ 8MHz draws 5.8mA in non-sleep mode.

System Architecture



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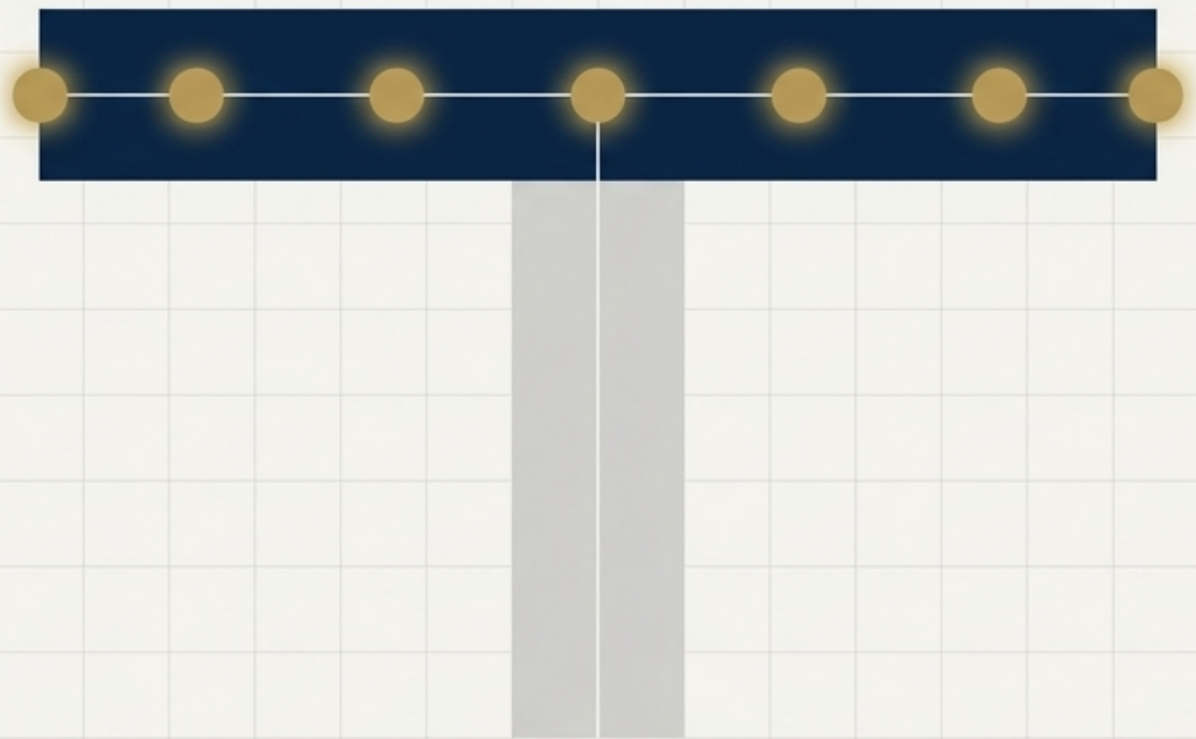
Spanning the Stack: From Core Engineering to the Digital Frontier

A deep foundation in electrical engineering provides the framework to not only understand but strategically apply a wide spectrum of modern digital technologies—transforming physical systems into intelligent, connected solutions.



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Mastering the Data & Cloud Ecosystem

Cloud & AI Platforms

Capability: Proficiency in building and deploying AI-powered applications using Azure.

Evidence:
Completed 27-module Microsoft AI Skills Challenge, including: *Get started with Azure OpenAI Service*, *Implement Retrieval Augmented Generation (RAG)*, and *Perform vector search*.

Data Management & Analytics

Capability: Expertise in database administration, migration, and optimization.

Evidence:
Completed Microsoft modules on *Migrate SQL workloads to Azure Managed Instances*, *Test and optimize SQL Server databases*, and *Explore Azure Storage for non-relational data*.

Software Engineering

Capability: Experience in software design, testing, and implementation.

Skills:
Python, C#, Java, .NET

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Engineering Security, Governance, and Compliance

Evidence of Expertise

- **Professional Engagement:** Submitted proposal to ISC2 Security Congress 2025 on “Thesis Master Doctoral Engineering Electrical Subject Curriculum Framework Qualification Education Technology”.
- **Core Competency:** Focus area in Governance, Risk, and Compliance (GRC).
- **Domain Knowledge:**
  - Threat Intelligence and Incident Management
  - Cyber-Physical Systems (CPS) Security and Privacy
  - Cybersecurity in Smart Infrastructure
  - Threats and Vulnerabilities in Digital Libraries (Bibliotechnology)
  - Digital Rights Management

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Exploring the Next Technological Horizons

Quantum Computing in Systems Engineering

- Quantum Algorithms
- Quantum Gates and Circuits
- Quantum Information Theory
- Quantum Supremacy

Masters in DLT Applications in Educational Technology

- Blockchain for Secure Credentialing
- Smart Contracts in Educational Transactions
- Privacy and Data Security in DLT

Advanced Biotechnology & Automation

- Advanced Studies in Autonomous Vehicles and Drones
- Fundamentals of Synthetic Biology
- Advanced Manufacturing Techniques in Genetic Engineering (CRISPR)

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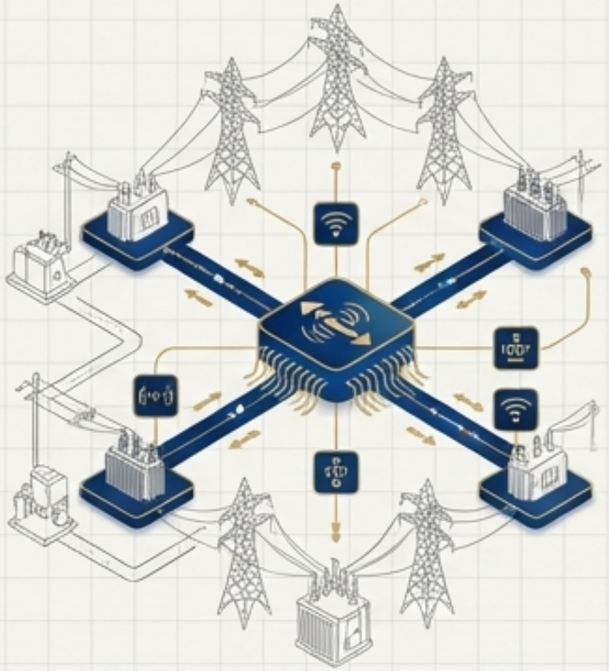
The Synthesis: Where Engineering and Technology Converge

True innovation occurs at the intersection of deep domain knowledge and broad technological application. The following areas represent a convergence of electrical engineering principles with modern data, IoT, and security frameworks.

Smart Grids & Intelligent Networks

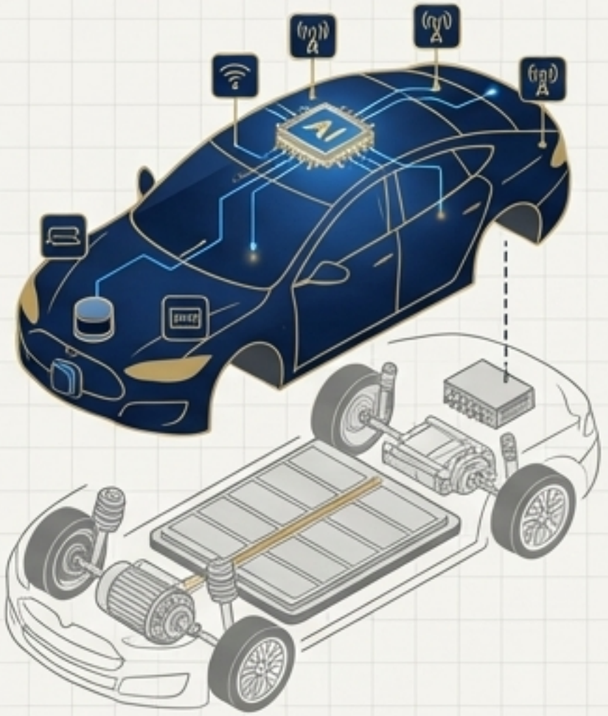
Designing and managing electrical infrastructure that leverages IoT, real-time data processing, and machine learning to optimize power distribution, enhance grid stability, and integrate renewable energy sources.



- Advanced Power System Analysis
- IoT Integration
- Load Management
- Smart Grid Performance

Autonomous Electric Vehicles & Drones

Developing the next generation of autonomous systems by integrating advanced control systems, sensor technologies, and machine learning with foundational electric vehicle engineering and renewable energy charging solutions.



- Electric Vehicle Engineering
- Sensor Technologies
- Machine Learning
- Control Systems
- IoT Communication Networks

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The Synthesis: Securing Infrastructure and Architecting Education

Cyber-Physical Systems (CPS) & Infrastructure Security

Ensuring the security and resilience of critical infrastructure where physical processes and computational systems are deeply intertwined. This involves securing everything from industrial control systems to smart city infrastructure against cyber threats.

CPS Security & Privacy
Real-Time Systems
Network Security
Immutable Data Storage
Cybersecurity in Smart Infrastructure

Educational Technology & Qualification Frameworks

Applying systems thinking to the design of modern educational frameworks. This includes leveraging DLT for secure credentialing, designing curricing curricula for technical trades (NATED, NCV), and aligning educational outcomes with national qualification standards (SAQA, DHET).

DLT in EdTech
Curriculum Design
Assessment and Evaluation
SAQA Frameworks
Technology Integration in Adult Learning

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A Portfolio of Advanced Studies and Research Interests

- Doctorate in Specialist Engineering Infrastructure and Contractors: Electrical Engineering
- Masters in Distributed-Ledger Technology Applications in Educational Technology
- Advanced Studies in Autonomous Vehicles and Drones for Electric Vehicle Engineering
- Quantum Computing in Systems Engineering
- Masters in Supply Chain Management and Traceability
- Masters in Immutable Data Storage Solutions for Web Design
- Specialist Engineering in Infrastructure: Electrochemical Engineering
- Clean Energy Technology: Ecotechnology Applications

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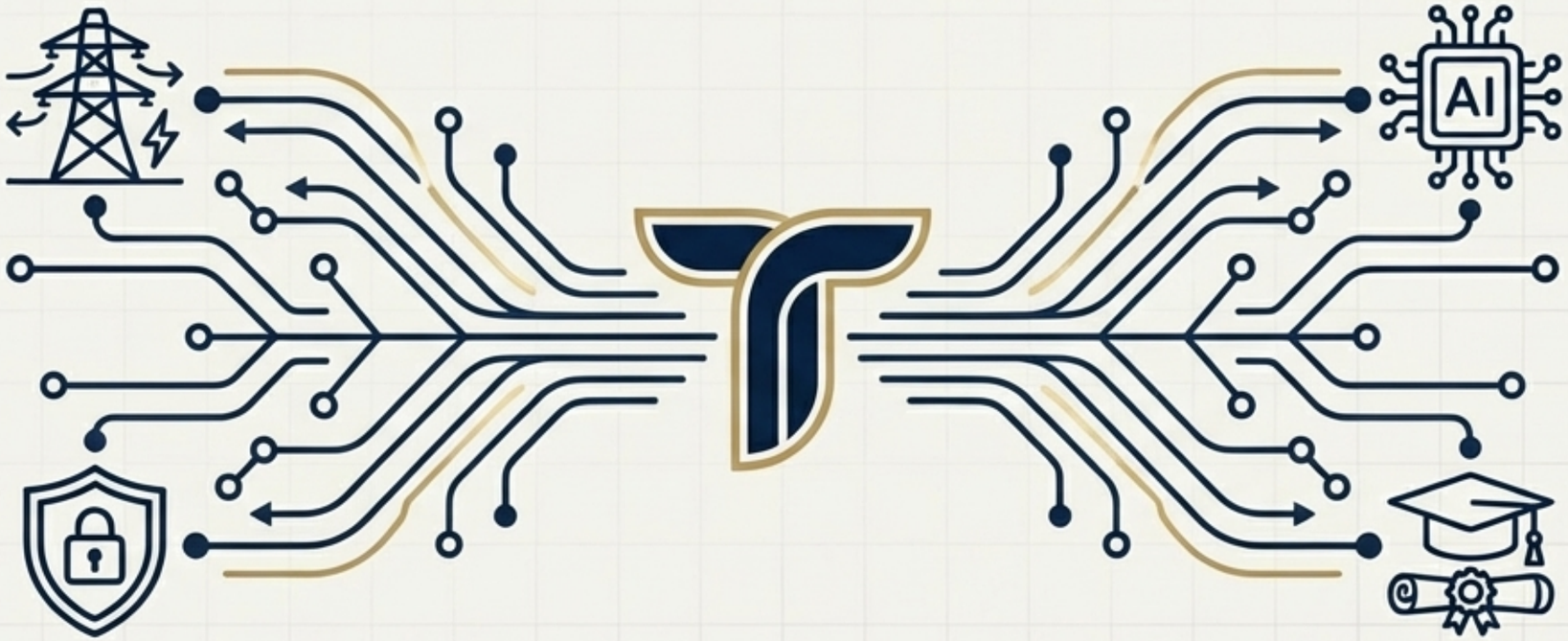
Equipped to Engineer a Smarter, More Secure Future

The convergence of deep electrical engineering expertise with a strategic command of the digital landscape creates a unique capability: the ability to architect, build, and secure the complex, integrated systems of tomorrow. The focus is on tackling critical challenges in sustainable energy, intelligent infrastructure, and the future of technical education and workforce development.



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